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$BR.a=c^2$, $AP.a=AR.a=bc$, $BP.a=a^2-b^2$, $CR.a=a^2-c^2$, *i. e.*, $PR.a=2bccosA$; (4) hence BA touches circle ARC , which contains a Brocard-point of ABC ; similarly for CA and circle APB ; (5) $BR.CR'$, $AR''=abc=CP.BP'$, AP'' (where R' , R'' , P' , P'' correspond to R , P , on CA , AB , respectively); K , K' are the Brocard constants ($k=a^2+b^2+c^2$) of ABC , $A'B'C'$: then $K'-K=\Delta^2/R^2$.

181. Proposed by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy, Ohio University, Athens, Ohio.

Prove that the extremities of the latera recta of all ellipses having a given major axis $2a$ lie on the parabola $x^2=-a(y-a)$.

CALCULUS.

142. Proposed by J. SCHEFFER, A. M., Hagerstown, Md.

Solve the differential equation,

$$(a-x)\frac{dz}{dx} + (b-y)\frac{dz}{dy} = c-z.$$

143. Proposed by L. C. WALKER, A. M., Petaluma High School, Petaluma, Cal.

Find the area of greatest ellipse that can be inscribed in a given semicircle.

144. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

Find the volume of the sphere, $x^2+y^2+z^2=2az$, (a) within the paraboloid $z=Ax^2+By^2$; (b) within the cone $z^2=Ax^2+By^2$.

MECHANICS.

134. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

If $pv=Rt-b/tv$ be the equation for CO_2 gas, find the total, external and internal work done in compressing the gas from 102 to 136 atmospheres at a constant temperature $17^\circ C$ and constant volume, $R=63.23$, $b=481600$ for CO_2 .

135. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College Defiance, Ohio.

What force acting at an inclination ω with a horizontal line on the center of a wheel of given weight will roll the wheel over an immovable cylindric log whose diameter is $(1/m)$ th that of the wheel?

DIOPHANTINE ANALYSIS.

91. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

There are two unequal square numbers the sum of whose sum, difference, product, and quotient, is a square. Find the two numbers.

92. Proposed by LON C. WALKER, A. M., Professor of Mathematics, Petaluma High School, Petaluma, Cal.

(a) Find the least three integral numbers such that the difference of every two of them shall be a square number; (b) Find the least three square numbers such that the difference of every two of them shall be a square number.

AVERAGE AND PROBABILITY.

119. Proposed by F. L. SAWYER, Mitchell, Ontario, Canada.

Two players throw three dice, the object being to throw at one cast a tres, a deux, and an ace. They continue throwing in succession until one of the players wins. What advantage has the first player?

120. Proposed by LON C. WALKER, A. M., Professor of Mathematics, Petaluma High School, Petaluma, Cal.

If a given ellipse be placed at random on another equal ellipse, find the chance that the center of the first will fall on the second.

NOTES.

The Royal Society of London has awarded its Copley Medal to Prof. J. W. Gibbs, of Yale, for his contributions in Mathematical Physics.

We have in our possession some excellent articles for next year. In the January number will appear an article *Determination of all the Groups of Order* 168, by Dr. G. A. Miller, of Leland Stanford Jr. University.

According to a new post-office ruling at Washington, D. C., magazines are not allowed to be sent to subscribers longer than the time for which the subscription has been paid. In view of this ruling, it is necessary that our subscribers send in their subscriptions at once. Notices have been sent to all. Please respond to same immediately.

The New Geometry Waking the Sleep of Two Thousand Years is the title of an article which the new monthly, *Everybody's Magazine*, has secured from Dr. Halsted, to appear in the February issue.

If, by the management of a phenomenally successful journal, this article is expected to seize and hold the attention of its readers, what *must* be its interest for actual mathematicians? We think that it is no exaggeration to say that Dr. Halsted's Supplementary Report on Non-Euclidean Geometry at the Denver Meeting of the Association for the Advancement of Science aroused greater general interest than any other paper presented at the meeting. A like interest will certainly be taken in the forthcoming article. Our readers should be sure to secure a copy of the magazine containing this article.